





No. VIII.—THE INVERTEBRATE FAUNA OF INLAND WATERS.
—I. REPORT ON LOCH COULTER AND THE COULTER
BURN, STIRLINGSHIRE. By THOMAS SCOTT, F.L.S.

The systematic investigation of the fauna of fresh water lakes, especially in those of great depths, has in recent years been largely undertaken on the Continent, by Forel, Pavési, Fol, and a number of other investigators; but in this country comparatively little has yet been done on this subject. It is now proposed to make, from time to time as opportunity allows, a biological and physical investigation of the great Scottish lochs and inland waters, which cannot fail to be of interest in regard to the food-fishes which inhabit them, and will also incidentally throw light upon many other questions of scientific interest. The physical, and to some extent the biological, conditions of some of the West Coast lochs have been inquired into by Dr John Murray, the Director of the Challenger Commission; and Mr J. S. Grant Wilson a year or two ago made a physical examination of the lochs in Perthshire. A comparison will be made of the fauna of lochs, which have been in recent geological times cut off from the sea, with the fauna of typical inland lochs, and with that of those where there now occurs an admixture of sea water. The nature and distribution of the invertebrate organisms in the waters of very deep lochs will also be investigated. It is well known that marked differences exist between the trout and other edible fishes of many lochs. This inquiry by determining the main food of these fishes may lead to useful measures being recommended.

In compliance with instructions received, I began in June 1889 an investigation of the invertebrate fauna—especially the Crustacea and Mollusca—of Loch Coulter, and its effluent, the Coulter Burn.

Loch Coulter is situated in a natural hollow about 300 yards to the east of the Stirling and Kilsyth Road, and nearly midway between these two places. It lies almost due east and west; its greatest length is about 1100 to 1200 yards, its greatest breadth 600 to 700 yards, and it has a somewhat quadrangular outline. From the peculiar physical conditions of the district in which this loch is situated, only a few ditches drain into it, but one or more springs are reported to exist somewhere within its area. The Coulter Burn is the only outlet for the water of the loch. It takes its rise from the north-west corner, and flows east and north by a rather circuitous route, passing on its way through the well-known Howietoun Fisheries and Goldenhoof Dam, and joins the Bannock Burn a little to the south of the site of the historical battle of that name.

Sir J. Ramsay-Gibson-Maitland, Bart., kindly gave me information and advice, which were of the greatest value to me in making arrangements as to the manner in which the investigation should be made.

As I had to return to Edinburgh, in order to continue my investigations on the 'Garland,' it was decided, that as soon as arrangements could be made for proceeding with the work, my son, Mr Andrew Scott, should take my place in carrying on the proposed investigations, which he did on 12th June. In order to enable him to carry out the examination as carefully and accurately as possible, I drew up for his guidance a plan of work, dividing the district into sections, and instructing him to examine each separately and consecutively, and to take notes of the organisms observed and collect samples of material. My son completed his investigations on the 22nd of June, having examined Loch Coulter

and traversed and examined the Coulter Burn from its source to its confluence with the Bannock, and thence to the Forth, a distance of between 10 and 12 miles,—and it is chiefly from his notes and the material he collected that this Report is prepared.

The scheme of work to which I have referred, and which was adhered to as closely as possible, was as follows :—

1. Loch Coulter.
2. The Coulter Burn from the Loch to Craigquarter Wood.
3. The Coulter Burn from Craigquarter Wood to the Hatching House (connected with the Howietoun Fisheries).
4. The Coulter Burn from the Hatching House to the Ponds at Howietoun, including as far as possible an examination of the Ponds.
5. The Coulter Burn from the Ponds to Goldenhoof Dam, including an examination of the Dam.
6. The Coulter Burn from Goldenhoof Dam to its confluence with the Bannock.
7. The Bannock Burn from thence to the Forth.

In stating the results of the examination of the loch and its effluent it will perhaps be better to refer to each section separately, as this will to some extent simplify and localise the information secured.

1. LOCH COULTER.

In our examination of Loch Coulter, the tow-net, hand-net, and dredge were used. We first of all used the tow-net, towing it for a time just under the surface of the water, when we soon ascertained that the water all over the loch was teeming with Entomostracan organisms. The tow-net was then fixed to the dredge rope, the dredge being used as a 'sinker,' and towed close to the bottom. Various parts of the loch were examined in this way, and Entomostraca were again observed to be abundant; in fact, on looking over the side of the boat, they could easily be observed in great numbers swimming about near the surface. The bottom was next examined by means of the dredge, and the results showed that the depth of the loch did not much exceed 5 fathoms at the deepest part, which was near the east end. At this end the bottom was hard and stony, and appeared to be unsuitable for the existence of Mollusca or other non-pelagic organisms, as very few were obtained at this part. Towards the north end the bottom was found to consist, more or less, of fine vegetable mud, on which several species of Molluscs appeared to live, a few of them being common, while others were more sparingly distributed. The examination of the mud also yielded a number of species of Ostracoda; the individuals of this group were, however, not very plentiful, the macrospores of *Isoetes lacustris*—an aquatic plant allied to the Clubmosses—were very common in the mud. As Entomostraca were observed to be so abundant in the water of Loch Coulter, we endeavoured to ascertain whether the fish in the loch were feeding on them. For this purpose efforts were made, by means of hook and line, to capture some of the fish, but a few perch only were obtained; and though the stomachs of these were carefully examined, no Entomostraca were observed, a few insects being the only objects discernible. Though trout were noticed swimming about in the water, they appeared to be very shy, and none were caught; I am, therefore, unable to say whether they were feeding on the Entomostraca or not. The following is a list of the Mollusca and Crustacea observed in and round the sides of the loch :—

MOLLUSCA.

<i>Sphærium corneum</i> (Linné).	Not common.
<i>Pisidium amnicum</i> .	Rare.
„ <i>fontinale</i> (Draparnaud).	Frequent.
„ <i>pusillum</i> (Gmelin).	Frequent.
„ <i>nitidum</i> (Jenyns).	Common.
<i>Valvata piscinalis</i> (Müller).	Common.
<i>Planorbis albus</i> , Müller.	Rare.
„ <i>contortus</i> (Linné).	Common.
<i>Limnæa peregra</i> (Müller).	Not common.
„ <i>truncatula</i> (Müller).	Not Common.

CRUSTACEA.

DAPHNIADÆ.

<i>Daphnia pulex</i> ,	Very Common.	} <i>Ephippia</i> also frequent.
„ <i>vetula</i> ,	Frequent.	

COPEPODA.

<i>Diaptomus castor</i> ,	Very common.
<i>Cyclops pulchellus</i> ,	Common.
„ <i>strenuus</i> ,	Frequent.
„ <i>gigas</i> ,	Very common (several stages).

OSTRACODA.

<i>Cypria ophthalmica</i> (Jurine).	Frequent.
<i>Cypria serena</i> (Koch).	Frequent.
<i>Cyclocypris globosa</i> (G. O. Sars).	Not very common.
<i>Erpetocypris strigata</i> (O. F. Müller).	Not common.
„ <i>tumefacta</i> , Brady and Robertson.	Not common.
<i>Cypridopsis villosa</i> (Jurine).	Not very common.
<i>Candona candida</i> (O. F. Müller).	Frequent.
„ <i>rostrata</i> , Brady and Norman.	Scarce.
„ <i>kingsleii</i> , Brady and Robertson.	Scarce.

Insect larvæ, aquatic Coleoptera, Diatoms, and Confervæ were also observed to be more or less common both in the loch and around its margins.

2. THE COULTER BURN FROM THE LOCH TO CRAIGQUARTER WOOD.

After the loch had been carefully examined we next proceeded to examine this section of the Coulter Burn. Its course is over open moorland, and there are comparatively few places along its banks which form suitable habitats for aquatic organisms. No Mollusca* nor Crustacea were observed in this part of the burn, the only things noticed being insect larvæ—chiefly of the Phryganeidæ—but in the few marshy places and pools along its sides several species of Entomostraca and one or two of Mollusca were obtained. The water of the burn was very pure.

The following is a list of the Mollusca and Crustacea observed:—

* *Sphærium corneum* is, however, very abundant in the covered passages through which the burn runs from the sluice of Loch Coulter for several yards.

MOLLUSCA.

Pisidium pusillum (Jurine). Frequent.
Limnæa truncatula (Müller). Frequent.

CRUSTACEA.

OSTRACODA.

Cypria ophthalmica (Jurine). Frequent.
Cyclocypris globosa (G. O. Sars). Rare.
Erpetocypris tumefacta (Brady and Robertson). Frequent.
Cypridopsis villosa (Jurine). Not common.
Candona candida (O. F. Müller). Frequent.
 „ *rostrata*, Brady and Norman. Not very common.
 „ *kingsleii*, Brady and Robertson. Not very common.

3. THE COULTER BURN FROM CRAIGQUARTER WOOD TO THE HATCHING HOUSE.

Part of the course of the burn in this section is alongside the Kilsyth Road, so that its banks presented conditions even less favourable to the existence of aquatic organisms than in the previous section. The burn itself was also unproductive of anything noteworthy. The species observed and identified in this section were—

MOLLUSCA.

Pisidium pusillum (Gmelin). Few.
Limnæa peregra (Müller). Few.

CRUSTACEA.

OSTRACODA.

Cypria ophthalmica (Jurine). Few.
 „ *serena* (Koch). Not very common.
Cyclocypris globosa (G. O. Sars). Few.
Erpetocypris strigata (O. F. Müller). Not common.
 „ *tumefacta* (Brady and Robertson). Not common.
Cypridopsis villosa (Jurine). Not common.
Candona candida (Müller). Frequent.
 „ *kingsleii*, Brady and Robertson. Few.

4. THE COULTER BURN FROM THE HATCHING HOUSE TO THE PONDS AT HOWIETOUN.

This section included the examination of the burn from the Hatching House to the ponds at Howietoun and a few of the ponds. In describing our examination of Loch Coulter, reference was made to the immense number of Entomostraca in the water there, and the question of what became of these organisms suggested itself as one of the first points requiring consideration. An explanation, that seemed a fairly reasonable one, was that a great many of them would be carried down the burn with the overflow water, especially when during wet weather a larger quantity of water than usual passed down the burn. At the time we visited the

loch, the level of the water, we were informed, was about 4 feet higher than it usually is at that season, and consequently the overflow was greater than usual. In order, therefore, to ascertain whether Entomostraca were being carried down the stream, a tow-net was fixed in mid-channel a short distance up from where the water is led off into the rearing ponds at Howietoun; and, further, the net was so arranged that a large proportion of the water would pass through it, and thus give the experiment a fair trial. The net was fixed in position at 7.15 P.M. of the 13th, and removed about 8.15 A.M. of the 14th. Thus the water was allowed to pass through the net for fully 13 hours, but the result was not what had been expected, only a few *Cyclops*, *Gammarus*, Ostracods, and the larvæ of insects being captured. There was also a small quantity of mud in the net. The *Gammarus*, Ostracods, and insect larvæ were very likely carried into the net from some place in the vicinity of where the net was fixed, while the few *Cyclops* were probably the only organisms carried down from the loch. It was thus fairly evident that though Entomostraca were abundant in Loch Coulter, very few found their way down the stream.

On the stones in the burn a few of the common *Limnæa peregra* were observed, and a somewhat rare Ostracod—*Candona acuminata*—was obtained in a marshy place at the side, otherwise nothing requiring special notice was observed between the Hatching House and the ponds. In the ponds nothing of special interest was observed except that in one of them *Candona acuminata* was again noticed, and *Cypria exculpta* in another, in the 'Botanical pond' *Conferva* was moderately common.

The following are the species of Mollusca and Crustacea observed in this section:—

MOLLUSCA.

- Sphærium lacustre* (Müller). Plentiful in one of the ponds.
Pisidium fontinale (Draparnaud). Not common.
 „ *pusillum* (Gmelin). Not common.
 „ *nitidum* (Jenyns). Not common.
Ancylus fluviatilis (Müller). Common.
Limnæa peregra (Müller). Abundant.

CRUSTACEA.

AMPHIPODA.

- Gammarus pulex* (Linné). Frequent in the stream.

COPEPODA.

- Cyclops pulchellus*, Koch. A few in the net fixed in the stream.
 „ *serrulatus*, Fischer. A few in material collected by hand-net in one of the ponds.
 „ *crassicornis*, Müller. A few in the same material with the last.
Canthocamptus minutus (Müller). Frequent in one of the ponds.

OSTRACODA.

- Cypria exculpta* (S. Fischer). Frequent in one of the ponds.
 „ *ophthalmica* (Jurine). Frequent in one of the ponds.

Erpetocypris tumefacta (Brady and Robertson). A few in the burn and in the ponds.

Cypridopsis vidua (O. F. Müller). A few in one of the ponds.

„ *villosa* (Jurine). A few in the burn and in one of the ponds.

Candona candida (Müller). Frequent in the burn and ponds.

„ *lactea*, Baird. In one of the ponds, rather rare.

„ *acuminata* (Fischer). In the burn and one of the ponds, rather rare.

„ *kingsleii*, Brady and Robertson. In marshy ground by the side of the burn, not common.

Aquatic *Acari* and *Coleoptera*, the larvæ of *Coleoptera* and Phryganeidæ, were also observed both in the burn and in the ponds.

5. THE COULTER BURN FROM HOWIETOUN TO GOLDENHOOF.

This section includes the Howietoun Ponds to Goldenhoof Dam as well as the dam itself. Between the ponds and Goldenhoof the burn is locally known by the name of the Stockbridge Burn. Very few organisms were observed in this part of the burn. It flows too rapidly to permit of anything, except perhaps insect larvæ or *Ancylus*, getting a foothold. There were, however, a few marshy places by the side of the burn that yielded a number of *Ostracoda*, among which was *Cypris reticulata*—a species which, though generally distributed, is not very common.

The dam is of comparatively small area; part of its margin is densely fringed with reeds and other aquatic plants, which afford shelter to numerous organisms. Among these *Mollusca* and various groups of *Entomostraca* were common, as well as Diatoms, Confervæ, and the larvæ of insects. The water is not very deep, the deepest part being scarcely over 6 feet; the bottom is formed of fine mud, evidently consisting very much of vegetable débris, for when it was disturbed bubbles of marsh-gas rose to the surface of the water. Trout were moderately common in the dam, and it was ascertained, by the examination of the stomachs of some of them, that they were feeding on insects and *Entomostraca*, especially *Ostracoda*. The following are the species of *Mollusca* and *Crustacea* observed and identified in this section :—

MOLLUSCA.

Pisidium pusillum (Gmelin). Frequent in the dam.

Planorbis spirorbis, Müller. Frequent in the dam.

Limnæa peregra (Müller). Frequent in the dam and burn.

CRUSTACEA.

DAPHNIADÆ.

Eurycercus lamellatus (Müller). Not common in the dam.

Chydorus sphaericus (Müller). Not common in the dam.

Acroperus harpæ, Baird. In the dam not common.

COPEPODA.

Cyclops serrulatus, Fischer. Frequent in the dam.

Canthocamptus minutus (Müller). Frequent in the dam.

OSTRACODA.

- Cypria exsculpta* (Fischer). In the dam moderately common.
 „ *ophthalmica* (Jurine). In the dam frequent.
 „ *serena* (Koch). Marshy ground by the side of the burn, and in the dam frequent.
Cyclocypris globosa (G. O. Sars). In the dam not common.
Cypris reticulata, (Zaddach). Marshy ground by the side of the burn, rare.
Erpetocypris reptans (Baird). In the dam not common.
 „ *strigata* (Müller). Marshy ground by the side of the burn, rare.
 „ *tumefacta* (Brady and Robertson). In the dam not common.
Cypridopsis villosa (Jurine). In the dam frequent.
 „ *vidua* (Miiller). In the dam frequent.
Candona candida (Miiller). By the side of the burn and in the dam frequent.
 „ *lactea*, Baird. In the dam not common.
 „ *rostrata*, Brady and Norman. In the dam not common.
 „ *acuminata* (Fischer). In the dam not common.
 „ *kingsleii*, Brady and Robertson. In the dam not common.

6 & 7. THE COULTER BURN FROM GOLDENHOOF TO THE BANNOCK AND THENCE TO THE FORTH.

The Coulter Burn after leaving Goldenhoof Dam runs eastward for 600 to 700 yards, then northward for a few hundred yards more, and joins the Bannock not very far from the site of the famous battle of Bannockburn. Along the part of its course the water flows with considerable rapidity except in a few places where quiet pools are formed. The fresh-water limpet *Ancylus fluviatilis*, and the larvae of Caddis flies, were observed under or attached to the stones in the stream; while in the quiet pools, as well as in the marshy places along its banks, a number of Entomostraca and a few Mollusca were obtained. The Bannock Burn, from where it is joined by the Coulter down to the village of Bannockburn, also yielded a number of Mollusca and Entomostraca, but from that village to the Forth, very few such organisms were observed, probably owing to the water being more or less contaminated by the refuse from the public works on its banks. Between the village of Bannockburn and the Forth the Bannock flows between steep banks through a comparatively level tract of country and its course is very tortuous. The distance as the crow flies from where the Bannock is joined by the Coulter Burn to its union with the Forth is scarcely $3\frac{1}{2}$ miles, while the course of the burn measures fully 6 miles. Though the water appeared to be contaminated, both trout and sticklebacks were observed to be moderately frequent; the impurity of the water did not seem to have so much effect on these as on the Entomostraca.

The following is the list of the Mollusca and Crustacea observed and identified with Sections VI. and VII:—

MOLLUSCA.

- Pisidium pusillum* (Gmelin). Moderately common in Section VI. and upper part of Section VII.

Pisidium nitidum, Jenyns. Moderately common in upper part of Section VII.

„ *roseum*, Sholtz. Rare, lower part of Section VII.

Planorbis contortus (Linné). Frequent in upper part of Section VII.

Ancylus fluviatilis (Müller). Frequent in Section VI.

Limnæa peregra (Müller). Not very common in both sections.

„ *truncatula* (Müller). Not very common in both sections.

CRUSTACEA.

DAPHNIADÆ.

Chydorus sphaericus Müller. Not very common, Section VI.

COPEPODA.

Cyclops serrulatus, Fischer. Frequent in Section VI.

Canthocamptus minutus (Müller). Frequent in Section VI.

OSTRACODA.

Cypria ophthalmica (Jurine). Frequent in Section VI. and upper part of Section VII.

„ *serena* (Koch). Frequent in upper part of Section VII.

Cyclocypris globosa (G. O. Sars). Not common in upper part of Section VII.

Erpetocypris reptans (Baird). Not common in upper part of Section VII.

„ *strigata* (Müller). Rare in Section VI.

Cypridopsis villosa (Jurine). Not common in Section VI.

„ *vidua* (Müller). Not common in Section VI.

Candona candida (Müller). Frequent in both sections.

„ *rostrata*, Brady and Norman. Rare in Section VI.

„ *kingsleii*, Brady and Robertson. Rare in Section VII.

„ *fabæformis* (Fischer). Rare in Section VI.

„ *acuminata* (Fischer). Rare in Section VI.

Ilyocypris gibba (Ramdohr). Not common in lower part of Section VII.

As considerable changes have recently been made in the terminology of the fresh-water Ostracoda, I propose now to give a list of the species observed throughout the district examined, adding to each a synonymy sufficiently full to allow of the older works on this group of Crustacea being referred to with greater facility, together with notes on the distribution of the rarer species.

OSTRACODA.

Cypria exsculpta (S. Fischer).

1854. *Cypris exsculpta*, Fischer, Beitrag zur Kenntniss der Ostrac., p. 18, pl. xix. figs. 36-38.

1868. *Cypris striolata*, Brady, Mon. rec. Brit. Ostrac, p. 372, pl. xxiv. figs. 6-10.

1880. *Cypris granulosa*, Robertson, Fresh and Brackish water Ostrac. of Clydesdale, p. 18, (jun.)

1889. *Cypria exsculpta*, Brady and Norman, Mon. M. and Fw. Ostrac. of the N. Atlantic and N. W. Europe, p. 68, pl. xi. figs. 1-4.

This is a widely distributed species, though not previously recorded for Stirlingshire.

Cypria ophthalmica (Jurine).

1820. *Monoculus ophthalmicus*, Jurine, Hist. des Monocles, p. 178, pl. xix. figs. 16–17.
 1835. *Cypris compressa*, Baird, Trans. Berw. Nat. Club, vol. i. p. 100, pl. iii. fig. 16.
 1868. *Cypris compressa*, Brady, *op. cit.*, p. 372, pl. xxiv. figs. 1–5; pl. xxxvi. fig. 6.
 1889. *Cypria ophthalmica*, Brady and Norman, *op. cit.*, p. 69, pl. xi. figs. 5–9.

One of the commonest of the British species.

Cypria serena (Koch).

1838. *Cypris serena*, Koch, Deutschlands Crustaceen, H. xxi., 22.
 1868. *Cypris lævis*, Brady, *op. cit.*, p. 374, pl. xxiv. figs. 6–8.
 1889. *Cypria serena*, Brady and Norman, *op. cit.*, p. 70.

A common species in Britain.

Cyclocypris globosa (G. O. Sars).

1863. *Cypris globosa*, G. O. Sars, Om en i Sommeren 1862 foretagen Zoologisk Reise i Christianias og Trondhjems Stifter, p. 27.
 1868. *Cypris cinerea*, Brady, *op. cit.*, p. 374, pl. xxiv. figs. 39–42; pl. xxxvi. fig. 7.
 1889. *Cyclocypris globosa*, Brady and Norman, *op. cit.*, p. 71, pl. xiv. figs. 1–2; pl. xi. figs. 10–18.

The distribution of this species seems to be more restricted. In Scotland it has been observed in the islands of Lewis and Bute, at West Loch Tarbert (Loch Fyne); in Kirkcudbrightshire; Loch Fitty, Loch Dow, and Black Loch, in Fife. Not previously recorded for Stirlingshire.

Cypris reticulata, Zaddach.

1844. *Cypris reticulata*, Zaddach, Synops. Crust. Pruss. Prodr., p. 24 (jun.)
 1868. *Cypris tessellata* (in part), Brady, *op. cit.*, p. 336, pl. xxiii. figs. 39–45.
 1883. *Cypris affinis*, Lilljeborg, International Fisheries Exhib. London. Sweden Cat., p. 146.
 1889. *Cypris reticulata*, Brady and Norman, *op. cit.*, p. 76, pl. viii., figs. 1–2; pl. xi. figs. 5–7.

This does not seem to be a commonly distributed species. The following are the Scotch localities where it has been observed:—Johnston Loch; Possil Marsh; Bishop Loch; side of Paisley Canal; side of Loch Ascog, Bute; Hairmyres, near East Kilbride; Mill Loch, Lochmahen; and Barron Loch, Peebles.

Erpetocypris reptans (Baird).

1850. *Candona reptans* and *similis*, Baird, Brit. Entom., pp. 162, 167.
 1868. *Cypris reptans*, Brady, *op. cit.*, p. 370, pl. xxv. figs. 10–14; pl. xxxvi. fig. 4.
 1889. *Erpetocypris reptans*, Brady and Norman, *op. cit.*, p. 84 pl. xiii. fig. 27.

A common British species.

Erpetocypris strigata (O. F. Müller).

1785. *Cypris strigata*, O. F. Müller, Entomostraca, p. 54, pl. iv. figs. 4-6.
 1844. *Cypris jurinii*, Zaddach, Synops. Crust. Pruss. Prodr., p. 36.
 1870. *Cypris ornata*, Brady (non Müller), Nat. Hist. Trans. Northumb. and Durham, vol. iii. p. 364, pl. xiv. figs. 1-3.
 1889. *Erpetocypris strigata*, Brady and Norman, *op. cit.*, p. 85, pl. viii. figs. 14, 15.

This is not so commonly distributed as the last. The following are some Scotch localities:—Duddingston Loch; Ponds near Taymouth Castle; Isle of Cumbrae; Hayston Dam, Peebles. Not previously recorded for Stirlingshire.

Erpetocypris tumefacta (Brady and Robertson).

1870. *Cypris tumefacta*, Brady and Robertson, Ostracoda and Foraminifera of Tidal Rivers, Ann. Nat. Hist., ser. iv., vol. vi. p. 13, pl. iv. figs. 4-6.
 1889. *Erpetocypris tumefacta*, Brady and Norman, *op. cit.*, p. 87, pl. viii. figs. 5-7; pl. xiii. fig. 18.

This seems to be one of the less common species. It has not been previously recorded for Stirlingshire.

Cypridopsis vidua (Müller).

1785. *Cypris vidua* (Müller), Entomostraca, p. 55.
 1850. *Cypris sella*, Baird, British Entom., p.
 1868. *Cypridopsis vidua*, Brady, *op. cit.*, p. 375, pl. xxiv. figs. 27-36, 46.
 1869. *Cypridopsis obesa*, Brady and Robertson, Ann. Nat. Hist., ser. iv., vol. iii. p. 364, pl. xviii. figs. 5-7.
 1889. *Cypridopsis vidua*, Brady and Norman, *op. cit.*, p. 89.

This is a widely distributed species.

Cypridopsis villosa (Jurine).

1820. *Monoculus villosa*, Jurine, Hist. des Monocles, p. 178.
 1850. *Cypris westwoodii* and ?*elongata*, Baird, Brit. Entom., p. 156.
 1868. *Cypridopsis villosa*, Brady, *op. cit.*, p. 377, pl. xxiv. figs. 11-15; pl. xxxvi. fig. 9.
 1889. *Cypridopsis villosa*, Brady and Norman, *op. cit.*, p. 90.

This is moderately common in Scotland.

Candona candida (Müller).

1785. *Cypris candida*, Müller, Entom., p. 62, tab. vi. figs. 7-9.
 1850. *Candona lucens*, Baird, Brit. Entom., p. 160, tab. xix. fig. 1.
 1889. *Candona candida*, Brady and Norman, *op. cit.*, p. 98, pl. x. figs. 1, 2, 14-23.

Common everywhere—very variable.

Candona lactea, Baird.

- Candona lactea*, Baird, Proc. Zool. Soc. Lond., p. 255, pl. xviii. figs. 25-27.
 1868. *Candona detecta*, Brady (var.), *op. cit.*, p. 384, pl. xxiv. figs. 35-38; pl. xxxvii. fig. 2.
 1889. *Candona lactea*, Brady and Norman, *op. cit.*, p. 100.

Generally distributed, but not so common as the last.

Candona rostrata, Brady and Norman.

1857. *Cypris compressa*, Fischer, Ueber das genus *Cypris*, p. 144, pl. ii. figs. 7–12; pl. iii. figs. 1–5.
 1889. *Candona rostrata*, Brady and Norman, *op. cit.*, p. 101, pl. ix. figs. 11, 12, 12 *a* and *b*; pl. xii. figs. 22–31.

This is one of the less common *Candonæ*, though it may be more widely distributed than we know of at present. It has been observed in Duddingston Loch; in Loch Fitty and Lurg Loch, in Fife; Loch Fad, in Bute, &c.; but it does not appear to have been recorded before for Stirlingshire.

Candona kingsleii, Brady and Robertson.

1870. *Candona kingsleii*, Brady and Robertson, Ann. and Mag. Nat. Hist., ser. ix., vol. vi. p. 17, pl. ix. figs. 9–12.
 1889. *Candona kingsleii*, Brady and Norman, *op. cit.*, p. 102, pl. ix. figs. 19–22; pl. xiii. fig. 19.

A widely distributed species, but not previously recorded for Stirlingshire.

Candona fabæformis (Fischer).

1851. *Cypris fabæformis*, Fischer, Ueber das Genus *Cypris*, p. 146, pl. iii. figs. 6–16.
 1870. *Candona diaphana*, Brady and Robertson, Ann. and Mag. Nat. Hist., ser. iv., vol. vi. pl. v. figs. 1–3.
 1889. *Candona fabæformis*, Brady and Norman, *op. cit.*, p. 103, pl. ix. figs. 1–4.

This species is somewhat restricted in its distribution, and does not appear to have been previously recorded for Stirlingshire. It is found at Corstorphine and Luffness Links.

Candona acuminata (Fischer).

1857. *Cypris acuminata*, Fischer, Ueber das Genus *Cypris*, p. 148, pl. iv. figs. 12–16.
 1889. *Candona acuminata*, Brady and Norman, *op. cit.*, p. 104, pl. ix. figs. 9–10; pl. x. figs. 5, 6.

This is considered to be a rare species in Britain, though it is probable that its distribution is more extensive than is known at present. It has not been previously recorded for Stirlingshire.

Ilyocypris gibba (Ramdohr).

- (?) *Cypris gibba*, Ramdohr, Mag. und Geselech. Naturforsch. Freunde zu Berlin, ii. p. 91.
 1868. *Cypris gibba*, Brady, *op. cit.*, p. 369, pl. xxiv. figs. 47–54; pl. xxxvi. fig. 2.
 1889. *Ilyocypris gibba*, Brady and Norman, *op. cit.*, p. 107, pl. xxi. figs. 1–5.

A common British species.

TABLE II.—DAPHNIADÆ AND COPEPODA.

List of Daphniadæ and Copepoda obtained, showing their Distribution in the District, in June 1889, and also their Distribution in Britain.
x signifies 'rare,' x x 'frequent,' and x x x 'common.'

Name of Species.	Distribution in the District examined.							Distribution in Britain.		
	Section I. Loch Coulter.	Section II. Coulter Burn.	Section III. Coulter Burn.	Section IV. Coulter Burn and Ponds.	Section V. Coulter Burn and Dam.	Section VI. Coulter Burn.	Section VII. Bannock Burn.	England.	Scotland.	Ireland.
DAPHNIADÆ.										
<i>Daphnia pulex</i> , .	x x x							x x	x x	x x
" <i>vetula</i> , .	x x							x x	x x	? ?
<i>Acroperus harpæ</i> , .					x	x		x	x	? ?
<i>Chydorus sphaericus</i> , .					x			x x	x x	? ?
<i>Eurycercus lamellatus</i> , .					x			x x	x x	? ?
COPEPODA.										
<i>Diaptomus castor</i> , .	x x x							x	x	x x
<i>Cyclops gigas</i> , .	x x x				x	x		x	x	x x
" <i>serrulatus</i> , .				x	x			x	x	x x
" <i>strenuus</i> , .	x x							x	x	
" <i>pulchellus</i> , .	x x x			x				x	x	
" <i>crassicornus</i> , .				x				x x	x x	
<i>Canthocamptus minutus</i> , .				x x	x x	x		x x	x x	x x







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